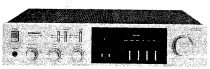
PIONEER

Service Manual

CIRCUIT DESCRIPTIONS



ORDER NO.
ART-765-0

STEREO AMPLIFIER

SA-720
SA-620
SA-520
SA-420

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
U.S. PIONEER ELECTRONICS CORPORATION 85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.
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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

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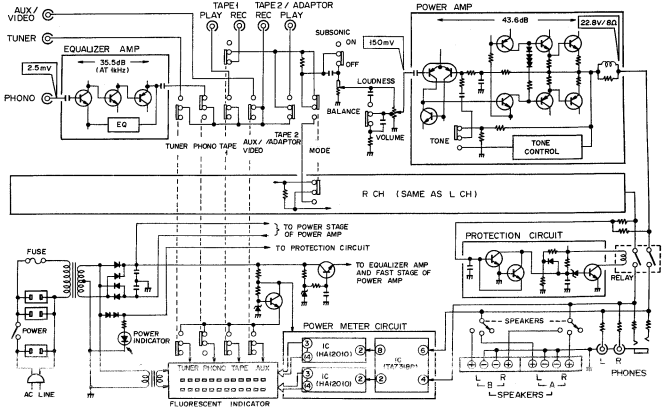
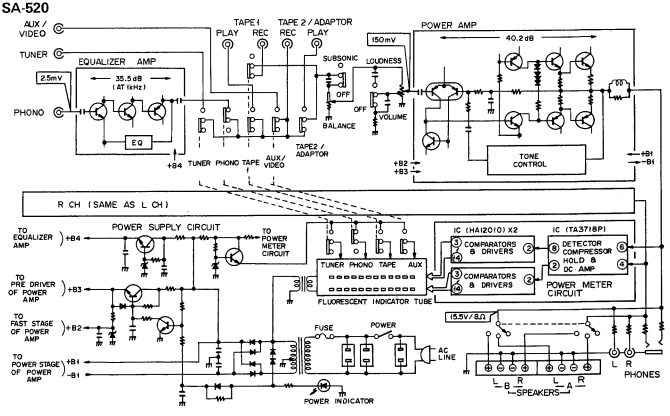
BLOCK DIAGRAM

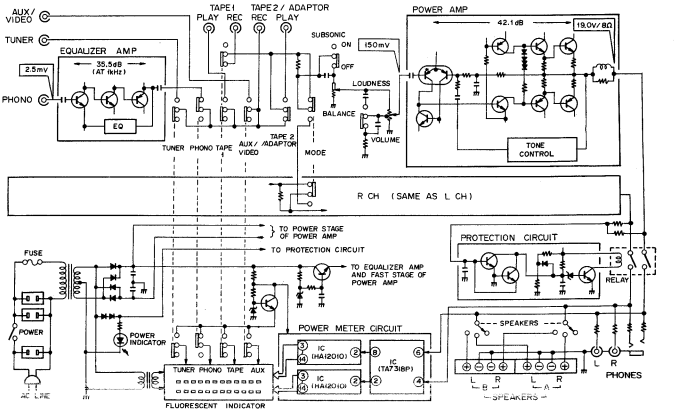
SA-720



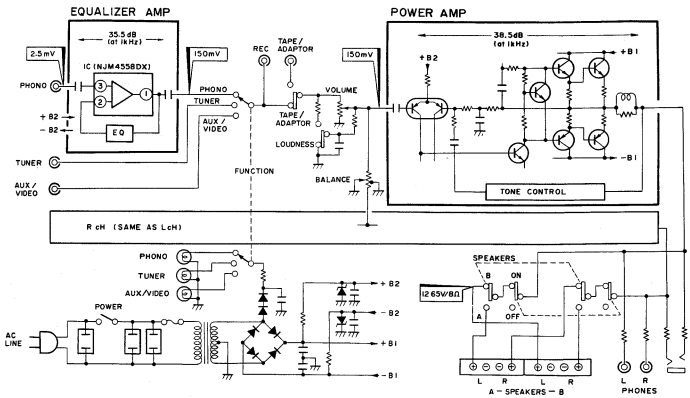
SA-520



SA-620


AUX/ VIDEO
TUNER
PHONO
2.5mV
EQUALIZER AMP
35.5dB (AT 1kHz)
EQ
TAPE1 PLAY REC
TAPE2 / ADAPTOR REC PLAY
SUBSONIC ON OFF
150mV
LOUDNESS
BALANCE
VOLUME
TUNER PHONO TAPE
TAPE 2 / ADAPTOR AUX / VIDEO
MODE
POWER AMP
42.1dB
19.0V/8Ω
TONE CONTROL
R CH (SAME AS L CH)
TO POWER STAGE OF POWER AMP
TO PROTECTION CIRCUIT
TO EQUALIZER AMP AND FAST STAGE OF POWER AMP
PROTECTION CIRCUIT
RELAY
FUSE
POWER
POWER INDICATOR
AC LINE
POWER METER CIRCUIT
IC (HA12010)
IC (TA7318P)
IC (HA12010)
TUNER PHONO TAPE AUX
FLUORESCENT INDICATOR TUBE
SPEAKERS
PHONES
L R
L R
B A
SPEAKERS

SA-420


EQUALIZER AMP
35.5 dB (at 1kHz)
2.5mV
IC (NJM4558DX)
PHONO
+B2
-B2
EQ
TUNER
AUX / VIDEO
150mV
PHONO
TUNER
AUX / VIDEO
REC
TAPE / ADAPTOR
150mV
VOLUME
TAPE / ADAPTOR
LOUDNESS
FUNCTION
BALANCE
POWER AMP
38.5dB (at 1kHz)
+B2
+B1
-B1
TONE CONTROL
R cH (SAME AS LcH)
PHONO
TUNER
AUX/VIDEO
POWER
AC LINE
+B2
-B2
+B1
-B1
SPEAKERS
B ON
A OFF
12.65V/8Ω
L R L R
A – SPEAKERS – B
L R
PHONES

CIRCUIT DESCRIPTIONS

Equalizer Amplifier

The SA-720, SA-620 and SA-520 feature a 3-stage direct coupled amplifier with emitter-to-emitter feed-back. An S/N ratio of 82dB (at 2.5mV input, IHF-A) has been achieved by using an ultra-low-noise NPN transistor (2SC2602) at the first stage, and reducing the input resistance and equalizer circuit impedance. The second stage load has been reduced, a large output voltage obtained, and the output impedance lowered by using an emitter follower at the output stage.

The maximum allowable input level of this circuit is 120mV (at 1kHz) and equalizer deviation ±0.3dB (20Hz — 20kHz).

The circuit of SA-420 is an NFB type equalizer amplifier, with one high-performance IC (NJM 4558DX) in both L and R channels.

This IC is a low-noise type, and provide an open-loop gain of 70dB. The main performance specifications for this circuit include a voltage gain of 35.5dB (at 1kHz), a phono dynamic margin or overload level of 120mV (at 1kHz), and equalization within ±0.5dB (30Hz — 15kHz).

Power Amplifier

This all-stage direct-coupled pure complementary SEPP circuit features a differential amplifier in the first stage, and in corporates the tone control circuits in the NFB loop.

Although the incorporation of the tone control circuits in the power amplifier stage reduces the number of elements that the signal has to pass through, and thereby further reduces noise, distortion, and cost, the power stage does require a higher gain and a higher degree of stability. In SA-720, SA-620 and SA-520, this high gain and high stability are achieved by a current mirror load differential amplifier in the first stage and by the use of a constant current circuit for the load of the pre-driver stage. In the SA-420, this high gain and high stability are achieved by a differential amplifier in the first stage and by the use of a bootstrap circuit for the load of the pre-driver stage.

The power amplifier stage is a complementary 2-stage Darlington connection.

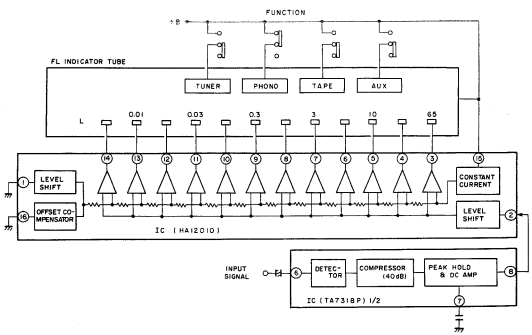


Fig. 1 Indicator circuit (SA-720, 620, 520)

Indicator Circuit (SA-720, SA-620 and SA-520)

The SA-720, SA-620 and SA-520 output power and function indicators feature fluorescent indicator tube (FL tube). In this tube, thermionic emissions from the cathode are accelerated into the fluorescent substance of the segmental anodes, resulting in the emission of light. This tube is used to indicate numerals, letters, and other symbols.

An outline of the FL tube drive circuit is shown in Fig. 1. The output circuit signal is applied to pin no.6 (4) of the IC (TA7318P-A). The IC contains a detector circuit, compressor (40dB), and peak hold circuit for both left and right channels. The dynamic range of the signal is thus contracted by 40dB to obtain a "peak held" DC voltage.

The output power indicator segments of the FL tube are driven by the HA12010 ICs (one for each channel) equipped with 12 pairs of differential amplifiers. These amplifiers are biased at increasing levels, so each amplifier will commence to operate separately as the input level increases. And since these amplifiers apply the voltages to the output power indicator segments, each successive segment will light up in turn as the input level rises.

The function indicators are lit up as a result of a voltage being applied to the corresponding function indicator segment according to the selected positions of the FUNCTION switch.

Muting Circuit (SA-520)

The purpose of this circuit is to mute the noise when the power switch is turned on and off.

With reference to Fig. 2, when the power switch is turned on, since the +B1 level is established more rapidly than the −B2 level, Q20 will initially be turned on (The time constant of +B1 circuit is shorter than the −B2 circuit). Therefore, the rise of Q21 emitter voltage (+B2) is delayed. Consequently, power amplifier is held in the cut off state.

As the −B2 level is gradually established, Q20 will be turned off, resulting in the Q21 emitter voltage (+B2) increase. This supplies (+B2) to the power amplifier first stage and pre-driver stage, and normal operation begins.

When the power switch is turned off, C60 discharges rapidly via D5 and R95 resulting in Q20 being turned on (The discharge time constant of the −B2 circuit is made shorter than that of the +B1 circuit by inserting D5 to make the discharge time of C60 faster). Therefore, C61 discharges rapidly via R115 and Q20, and thus Q21 emitter voltage (+B2) decreases by discharge time constant of C61, R115.

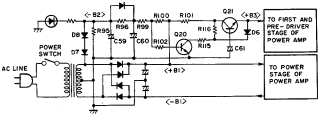


Fig. 2 Muting and power supply circuit (SA-520)

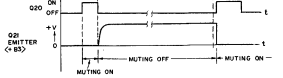


Fig. 3 Timing chart

Protection Circuit (SA-720, SA-620)

Besides protecting the speakers if a DC voltage should happen to appear at the power amplifier stage outputs, this circuit also mutes the signal path when the power switch is turned on and off. (See Fig. 4).

If for any reason a DC voltage (in excess of about ±5V) should happen to appear in the output of the power amplifier stage, it is detected immediately by either Q19 or Q20. Q19 is turned on by a positive voltage, and Q20 by a negative voltage. In either case, Q21 is also turned off, thereby opening the relay contact to disconnect the power amplifier stage from the speakers.

The muting action when the power switch is turned on is achieved by delaying the rise of the Q21 base potential by means of the R96/C60 time constant circuit. When the power switch is turned on, C60 is charged up via R96, thereby increasing the voltage across both ends of this capacitor. When this voltage exceeds the zener voltage of the D6 zener diode, Q21 is biased in the forward direction, and is thereby turned on to close the relay contact.

When the power switch is turned off, C60 discharges rapidly via D5, resulting in Q21 being turned off, thereby opening the relay contact.

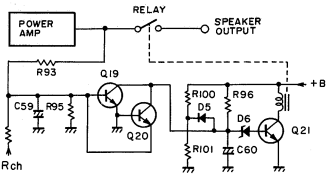
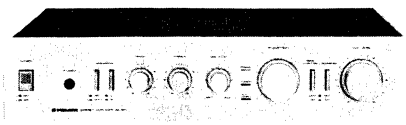


Fig. 4 Protection circuit (SA-720, SA-620)

PIONEER®

Service Manual

REPAIR & ADJUSTMENTS



ORDER NO.
ART-646-0

STEREO AMPLIFIER

SA-420

MODEL SA-420 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
S	110V, 120V, 220V and 240V (Switchable)	General export model
YP	240V only	Australia model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	United Kingdom model

- **This service manual is applicable to the KU type (pp. 1 – 17), YP and S types (pp. 19 – 27). When repairing the HE, HB types, please see the additional service manual (ART-647).** +1490
- **For the circuit description, please refer to the supplement of model SA-720 service manual (ART-765).**
- **Ce manuel d'instruction se refère au mode de réglage, en français.** +1312
- **Este manual de servicio trata del método de ajuste escrito en español.**

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3. BLOCK DIAGRAM 4
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    AJUSTE 17

ADDITIONAL SERVICE MANUAL FOR YP, AND S TYPES 19

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

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1. SPECIFICATIONS

Amplifier Section

Continuous power output of 21 watts* per channel, min., at 8 ohms from 30 Hertz to 20,000 Hertz with no more than 0.1% total harmonic distortion.

Total Harmonic Distortion (30 Hertz to 20,000 Hertz, 8 ohms, from AUX)
10 watts per channel power output ..... No more than 0.05%
Intermodulation Distortion (50 Hertz: 7,000 Hertz = 4 : 1 8 ohms, from AUX)
continuous rated power output ... No more than 0.2%
10 watts per channel power output ..... No more than 0.08%
Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) .. 30
Input (Sensitivity/Impedance)
PHONO ..... 2.5mV/50 kilohms
TUNER ..... 150mV/50 kilohms
AUX ..... 150mV/50 kilohms
TAPE PLAY/ADAPTOR ..... 150mV/50 kilohms
Phono Overload Level (T.H.D. 0.1%, 1,000Hz)
PHONO 120mV
Output (Level)
TAPE REC/ADAPTOR 150mV
Speaker ..... A, B, OFF
Frequency Response
PHONO (RIAA Equalization) .. 30Hz to 15,000Hz±0.5dB
TUNER, AUX, TAPE PLAY/ADAPTOR ..... 10Hz to 60,000Hz±3dB
Tone Control
BASS ..... ±9.5dB (100Hz)
TREBLE ..... ±9.5dB (10,000Hz)
Loudness Contour (Volume control set at –40dB position) ..... +8dB (100Hz), +0dB (10,000Hz)
Hum and Noise (IHF, short-circuited, A network)
PHONO 72dB
TUNER, AUX, TAPE PLAY/ADAPTOR 97dB

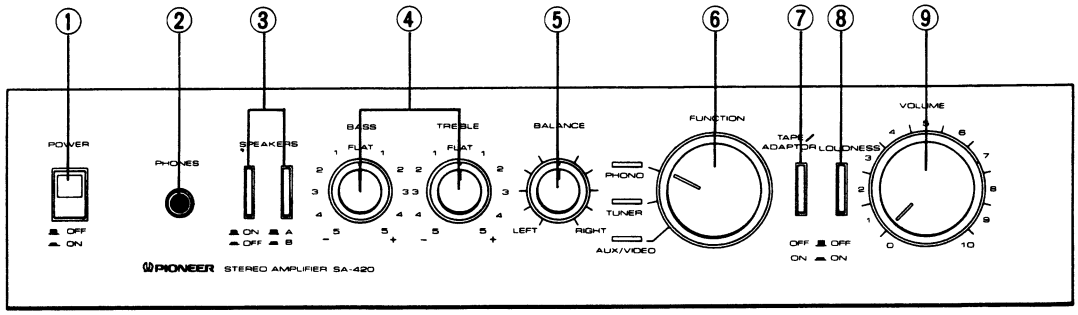
Miscellaneous

Power Requirements ..... AC 120V, 60Hz
Power Consumption ..... 60W (UL)
Dimensions ..... 420(W) x 94(H) x 267(D) mm
16-9/16(W) x 3-11/16(H) x 10-1/2(D) in
Weight (without package) ..... 4.6 kg (10 lb 2 oz)

NOTE:
Specifications and the design subject to possible modifications without notice due to improvements.

* *Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*

2. FRONT PANEL FACILITIES



- *The (▂) and (▁) for the pushbutton switches on the panel indicate the depressed and released position, respectively.*

① POWER SWITCH

Depress this switch to turn on or off power. When this switch is depressed, power is supplied. When this switch is released, power is turned OFF.

② PHONES JACK

Plug headphones into this jack for private listening.
Set the SPEAKERS selection switch to OFF.

③ SPEAKERS SELECTOR

These two switches are used to switch the output signals of the stereo amplifier's speaker terminals. The switch on the left switches the output signals on and off. When listening to the sound through the speakers, set this switch to the released position ON (▁). No sound will be heard through the speakers when this switch is set to the depressed position OFF (▂).
The switch on the right selects the A or B sets of speaker terminals. Set to the released position A (▁) when listening to the sound from the speaker systems connected to the A speaker terminals, and to the depressed position B (▂) when listening from the speaker systems connected to the B speaker terminals.

④ BASS AND TREBLE CONTROLS

Use these controls to adjust the tone. The right one controls treble and the left one controls bass.
FLAT is the neutral position. Turning knob clockwise accentuates the bass or treble, and turning knob counter-clockwise attenuates the bass or treble.

⑤ BALANCE CONTROL

This control should normally be set to center position. When the output from the left and right speakers or headphones is not the same, adjust by turning the control clockwise or counterclockwise.

⑥ FUNCTION SELECTOR

Use this selector to select the program source. When set, the function indicator corresponding to the position of the function selector will light up.

⑦ TAPE/ADAPTOR SWITCH

Depress this switch to ON when using a tape deck or a graphic equalizer (or any equipment) connected to the TAPE/ADAPTOR terminal.

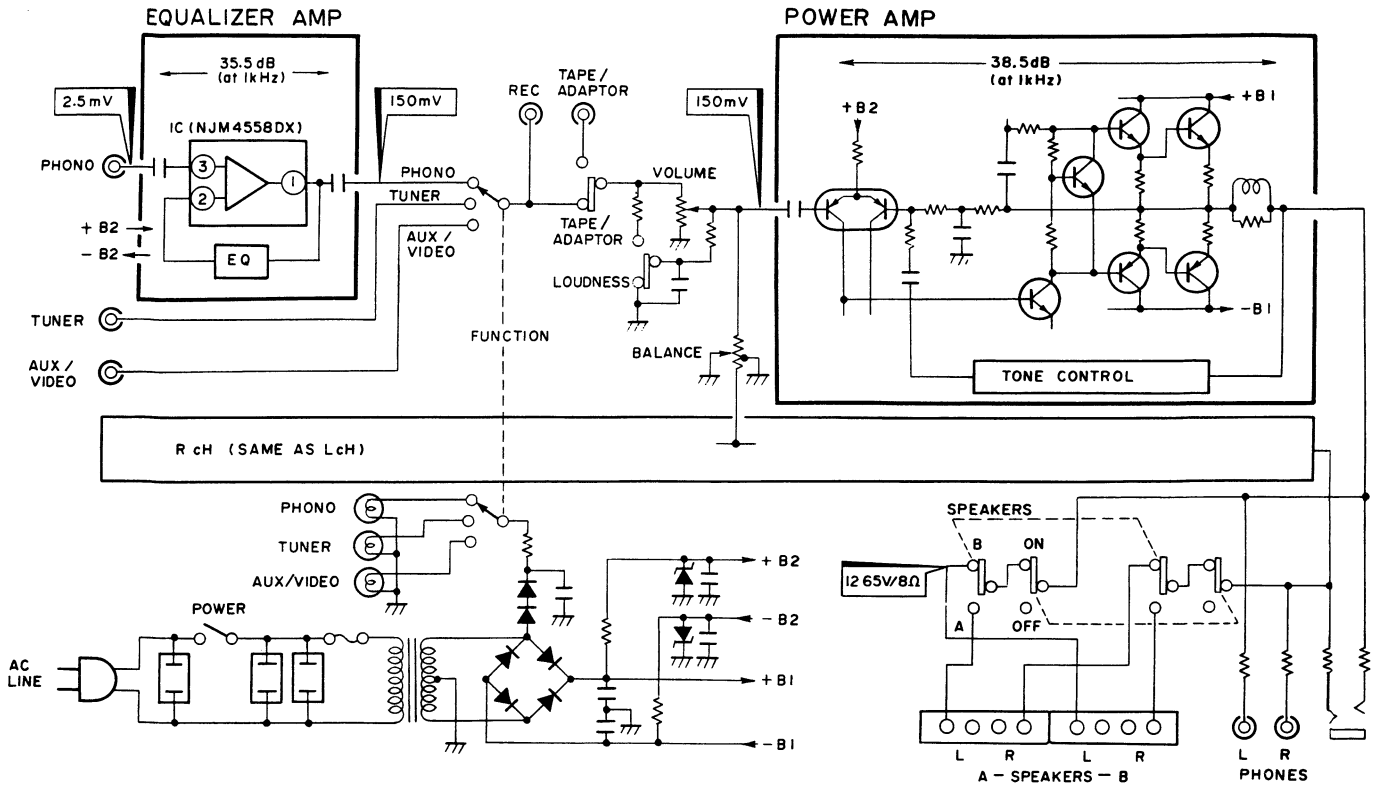
⑧ LOUDNESS SWITCH

Depress this switch to ON when listening at low volume. Bass will be emphasized to compensate for human listening characteristics and provide natural listening curve.

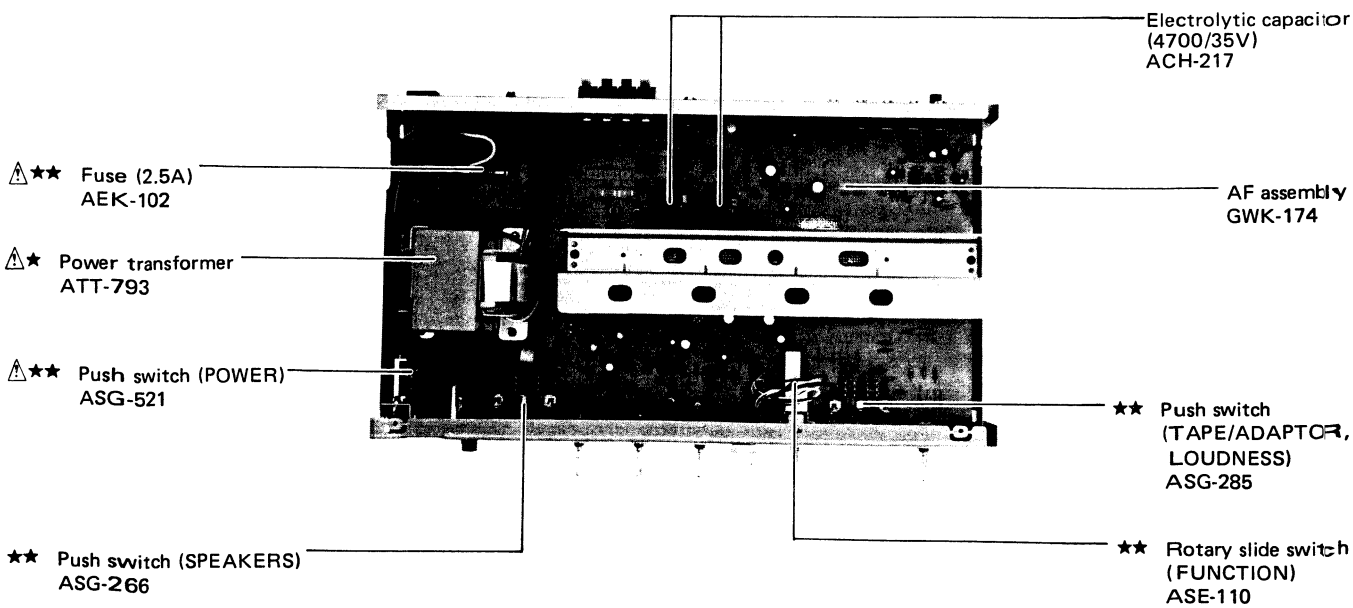
⑨ VOLUME CONTROL

Turn this control to adjust the output level to the speakers and the headphones. Output is minimum at 0 and increases as the control is turned clockwise.

3. BLOCK DIAGRAM



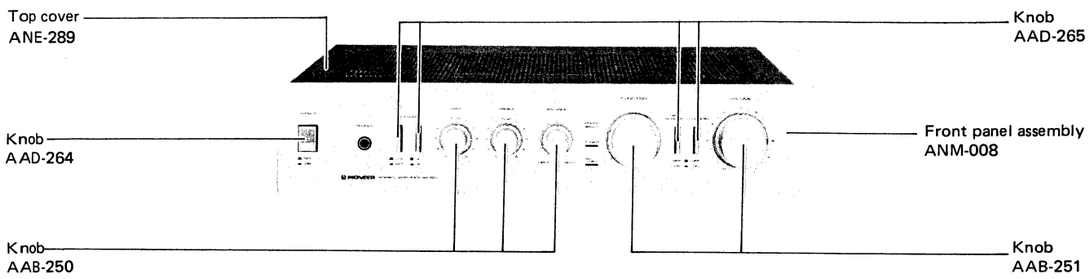
Top View


Electrolytic capacitor (4700/35V) ACH-217
⚠★★ Fuse (2.5A) AEK-102
AF assembly GWK-174
⚠★ Power transformer ATT-793
⚠★★ Push switch (POWER) ASG-521
★★ Push switch (TAPE/ADAPTOR, LOUDNESS) ASG-285
★★ Push switch (SPEAKERS) ASG-266
★★ Rotary slide switch (FUNCTION) ASE-110

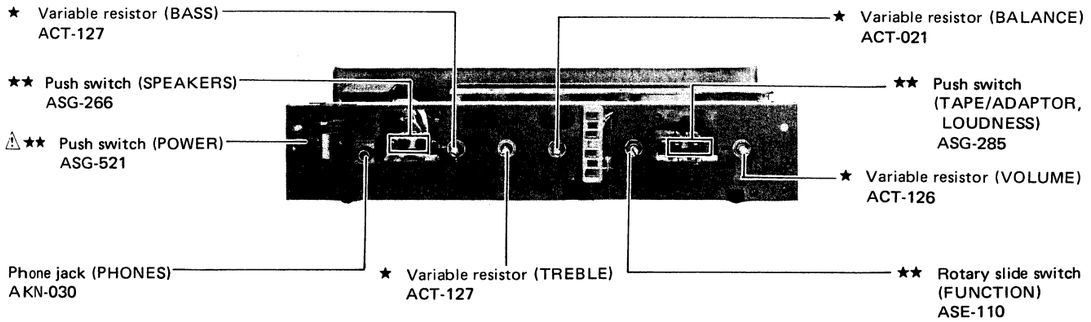
4. PARTS LOCATION

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ *GENERALLY MOVES FASTER THAN* ★.
  This classification shall be adjusted by each distributor because it depends on model number , temperature, humidity, etc.

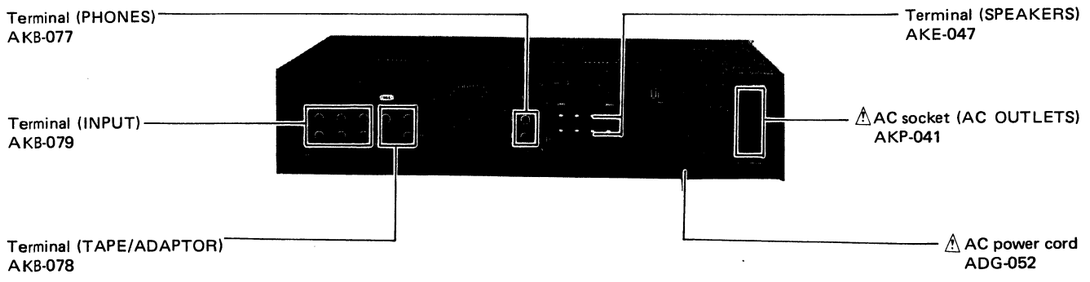
Front Panel View



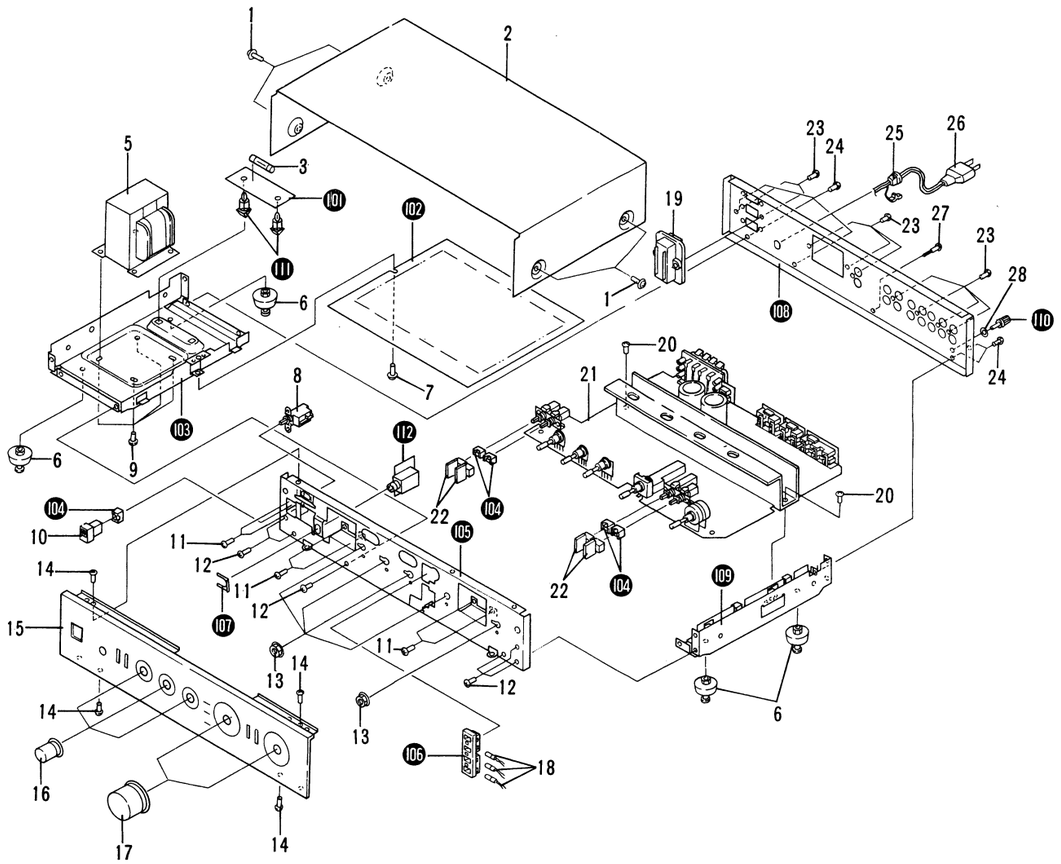
Front View with Panel Removed



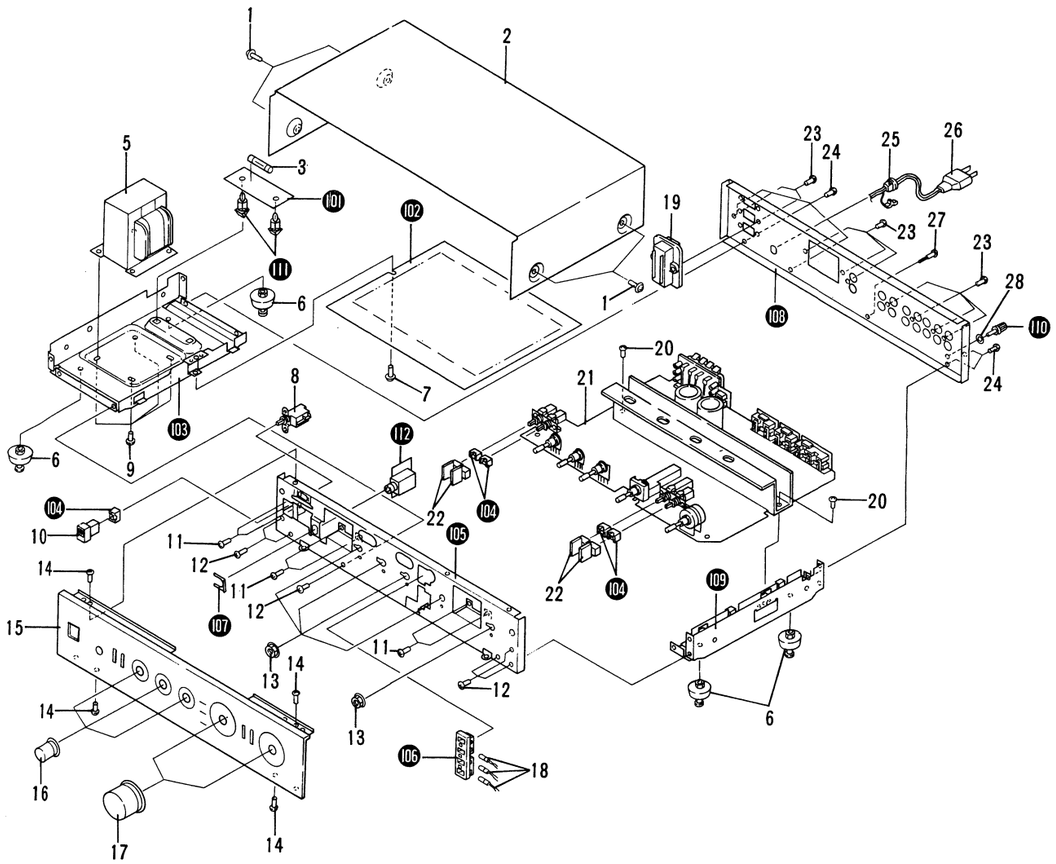
Rear Panel View



5. EXPLODED VIEW



5. EXPLODED VIEW



NOTES:

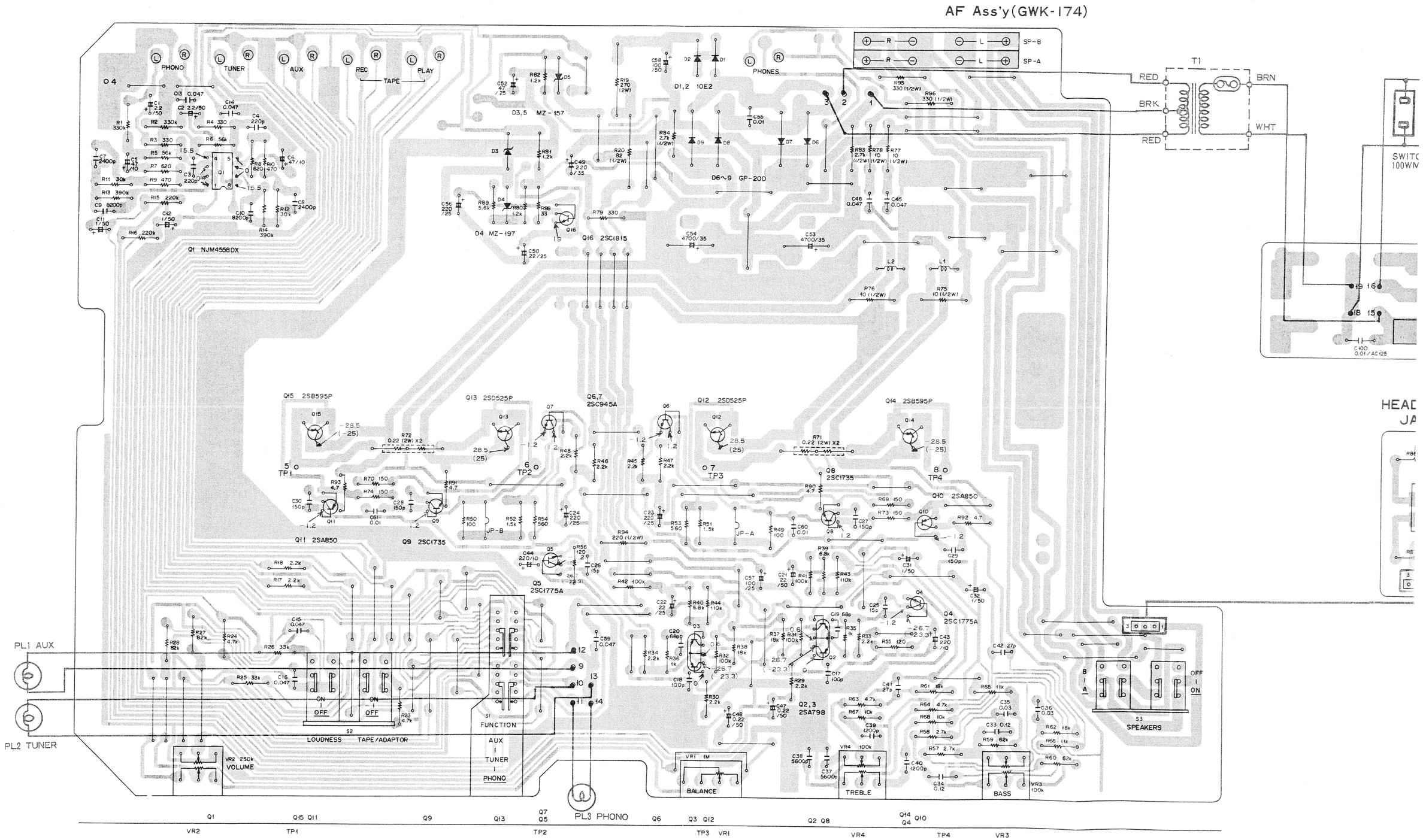
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List of Exploded View

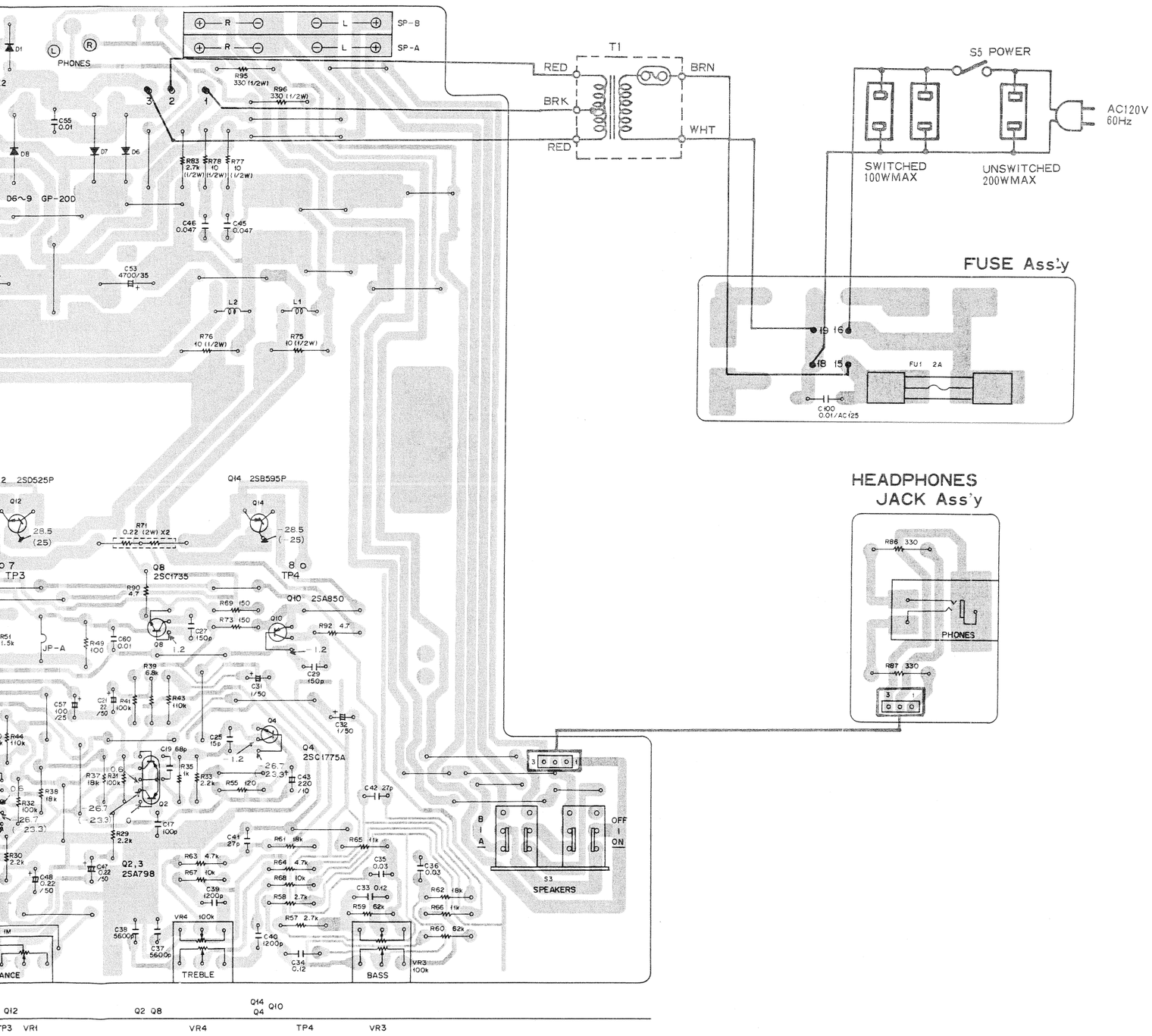
Mark	No.	Part No.	Description
	1.	FBT40P080FZK	Screw 4x8
	2.	ANE-289	Top cover
⚠ ★★	3.	AEK-102	Fuse (2.5A)
	4.	.....	
⚠ ★	5.	ATT-793	Power transformer
	6.	AEC-672	Foot assembly
	7.	ABA-246	Screw 3x12
⚠ ★★	8.	ASG-521	Push switch (POWER)
	9.	VXZ40P080FMC	Screw 4x8
	10.	AAD-264	Knob (POWER)
	11.	PMZ30P060FMC	Screw 3x6
	12.	VCZ30P060FMC	Screw 3x6
	13.	ABN-024	Nut M9
	14.	VBZ30P080FMC	Screw 3x8
	15.	ANM-008	Front panel assembly
	16.	AAB-250	Knob (BASS, TREBLE, BALANCE)
	17.	AAB-251	Knob (VOLUME, FUNCTION)
★★	18.	AEL-075	Lamp (Wire term. 8V/50mA)
⚠	19.	AKP-041	AC socket (AC OUTLETS)
	20.	BBT30P080FZK	Screw 3x8

Mark	No.	Part No.	Description
	21.	GWK-174	AF assembly
	22.	AAD-265	Knob (SPEAKERS, LOUDNESS, TAPE/ ADAPTOR)
	23.	MTZ30P100FZK	Screw 3x10
	24.	VCT30P060FZK	Screw 3x6
	25.	AEC-327	Strain relief
⚠	26.	ADG-052	AC power cord
	27.	ABA-176	Screw
	28.	WA35F100N080	Washer
	101.		Fuse assembly
	102.		Bottom plate
	103.		Frame
	104.		Flexible joint
	105.		Panel stay
	106.		Lamp holder
	107.		Mounting plate
	108.		Rear panel
	109.		Right frame
	110.		Terminal (GND)
	111.		P.C. Board holder
	112.		Headphones jack assembly

6. P.C. BOARDS CONNECTION DIAGRAM

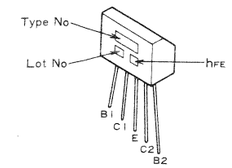


AF Ass'y(GWK-174)



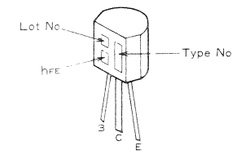
External Appearance of Transistors and ICs

2SA798



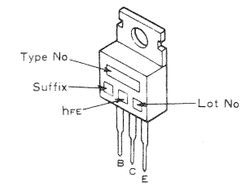
A

2SA850
2SC1735

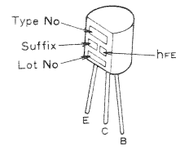


B

2SB595P
2SD525P

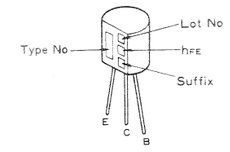


2SC1775A

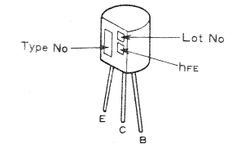


C

2SC945A



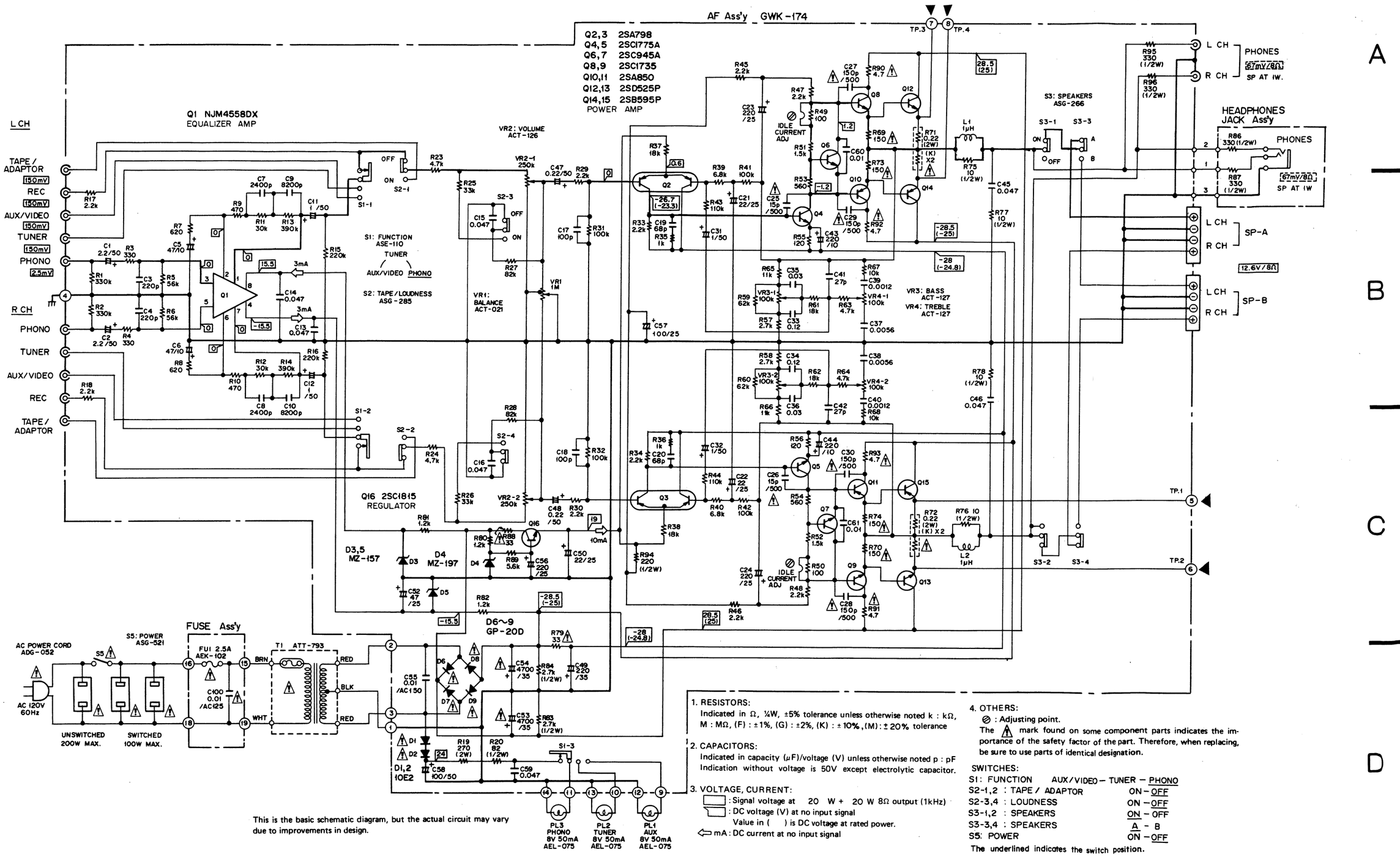
2SC1815



D

7. SCHEMATIC DIAGRAM

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M) : ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: Signal voltage at 20 W + 20 W 8Ω output (1kHz)
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦ mA : DC current at no input signal

4. OTHERS:
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

SWITCHES:

S1: FUNCTION	AUX/VIDEO – TUNER – PHONO	
S2-1,2 : TAPE / ADAPTOR	ON – OFF	
S2-3,4 : LOUDNESS	ON – OFF	
S3-1,2 : SPEAKERS	ON – OFF	
S3-3,4 : SPEAKERS	A – B	
S5: POWER	ON – OFF	

The underlined indicates the switch position.

8. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 x 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 x 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 100*	*5621*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number , temperature, humidity, etc.

Miscellaneous Parts

Mark	Part No.	Symbol & Description		Mark	Part No.	Symbol & Description
⚠ ★	ATT-793	T1	Power transformer	⚠	CCDSL 150K 500	C25, C26
⚠★★	AEK-102	FU1	Fuse (2.5A)	⚠	CCDSL 151K 500	C27—C30
⚠★★	AEL-075	PL1—PL3	Lamp (Wire term. 8V/50mA)		CCDSL 270J 50	C41, C42
⚠★★	ASG-521	S1	Push switch (POWER)		CCDSL 680J 50	C19, C20
⚠	AKP-041		AC socket (AC OUTLETS)		CCDSL 101J 50	C17, C18
⚠	ADG-052		AC power cord			
	GWK-174		AF assembly		CCDSL 221J 50	C3, C4
					CKDYF 473Z 50	C13—C16, C45, C46, C59
					CKDYF 103Z 50	C60, C61

AF Assembly (GWK-174)

CAPACITORS

Mark	Part No.	Symbol & Description	
	CEANL 2R2M 50	C1, C2	
⚠	ACH-217	C53, C54	Electrolytic (4700/35V)
	ACG-019	C55	Ceramic (0.01/AC150V)
	CEANL R22M 50	C47, C48	
	CEANL 010M 50	C31, C32	
	CEA 010M 50L	C11, C12	
	CEA 220M 25L	C21, C22, C50	
	CEA 470M 10L	C5, C6	
	CEA 101M 25L	C57	
	CEA 101M 50L	C58	
	CEA 221M 10L	C43, C44	
	CEA 470M 25L	C52	
	CEA 221M 25L	C23, C24, C56	
	CEA 221M 35L	C49	
	CQMA 122K 50	C39, C40	
	CQMA 562K 50	C37, C38	
	CQMA 124K 50	C33, C34	
	CQMA 242J 50	C7, C8	
	CQMA 822J 50	C9, C10	
	CQMA 303J 50	C35, C36	

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	ACT-021	VR1	Variable (BALANCE)
★	ACT-126	VR2	Variable (VOLUME)
★	ACT-127	VR3	Variable (BASS)
★	ACT-127	VR4	Variable (TREBLE)
⚠	ACN-070	R71, R72	Wire wound (0.22+0.22/2W)
	RD1/4PM□□□J	R1—R18, R23—R68, R80—R82, R89	
	RS2PL271J	R19	
	RD1/2PS□□□J	R20, R75—R78, R83, R84, R86, R87, R94—R96	
⚠	RD1/4PMF□□□J	R69, R70, R73, R74, R79, R88, R90—R93	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	NJM4558DX	Q1
★★	2SA798	Q2, Q3
★★	2SC1775A	Q4, Q5
★★	2SC945A	Q6, Q7
★★	2SC1735-D* (2SC1735-E*)	Q8, Q9
★★	2SA850-D* (2SA850-E*)	Q10, Q11

*hfe of Q8—Q11 should have the same value.

Mark	Part No.	Symbol & Description
★★	2SD525P-O)* (2SD525P-Y*)	Q12, Q13
★★	2SB595P-O* (2SB595P-Y*)	Q14, Q15
★★	2SC1815-GR	Q16

*hfe of Q12—Q15 should have the same value.

Mark	Part No.	Symbol & Description
⚠ ★	10E2 (SIB01-02)	D1, D2
★	MZ-197 (WZ-197)	D4
★	MZ-157 (WZ-157)	D3, D5
⚠ ★	GP-20D	D6—D9

SWITCHES

Mark	Part No.	Symbol & Description	
★★	ASE-110	S1	Rotary slide switch (FUNCTION)
★★	ASG-285	S2	Push switch (TAPE/ ADAPTOR, LOUDNESS)
★★	ASG-266	S3	Push switch (SPEAKERS)

OTHERS

Mark	Part No.	Symbol & Description
	VBZ30P080FMC	Screw 3x8
	AKB-077	Terminal (PHONES)
	AKB-078	Terminal (TAPE/ADAPTOR)
	AKB-079	Terminal (INPUT)
	AKE-047	Terminal (SPEAKERS)
	AEC-078	Insulator wafer
	AKH-005	Insulator spacer
	ABA-257	Screw 2.5x16

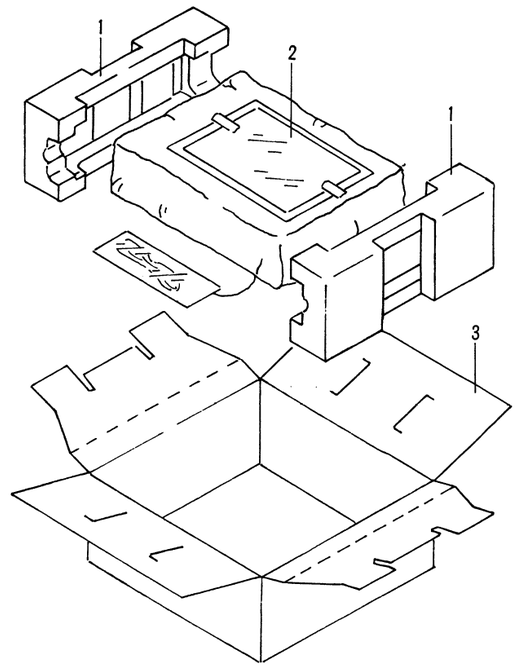
Headphones Jack Assembly

Mark	Part No.	Symbol & Description
	AKN-030	Phones jack (PHONES)
	RD1/2PS331J	R86, R87

Fuse Assembly

Mark	Part No.	Symbol & Description	
⚠	ACG-017	C100	Ceramic (0.01/AC125V)

9. PACKING



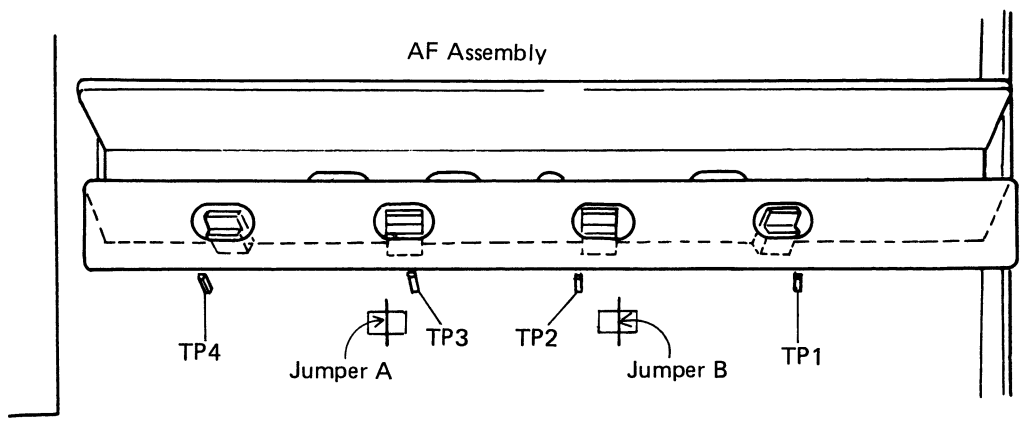
Mark	No.	Part No.	Description
	1.	AHA-290	Side pad
	2.	ARB-405	Operating instructions (English)
	3.	AHD-901	Packing case

10. ADJUSTMENT

Idle Current Adjustment

1. Turn the VOLUME control down to minimum level, turn the power on, and wait about 10 minutes.
2. Connect a DC voltmeter to the TP terminals (R ch; TP1 ⊖ and TP2 ⊕ , L ch; TP4 ⊖ and TP3 ⊕) of the AF assembly.
3. Check that the voltage between TP1 and TP2 (R ch) lies within the DC 2mV—110mV range. Then make a similar check for the L ch (between TP3 and TP4). If the voltage is less than 2mV, cut jumper A (L ch), and jumper B (R ch). If the voltage exceeds 110mV, check for circuit failure.

- **Remove the top cover**

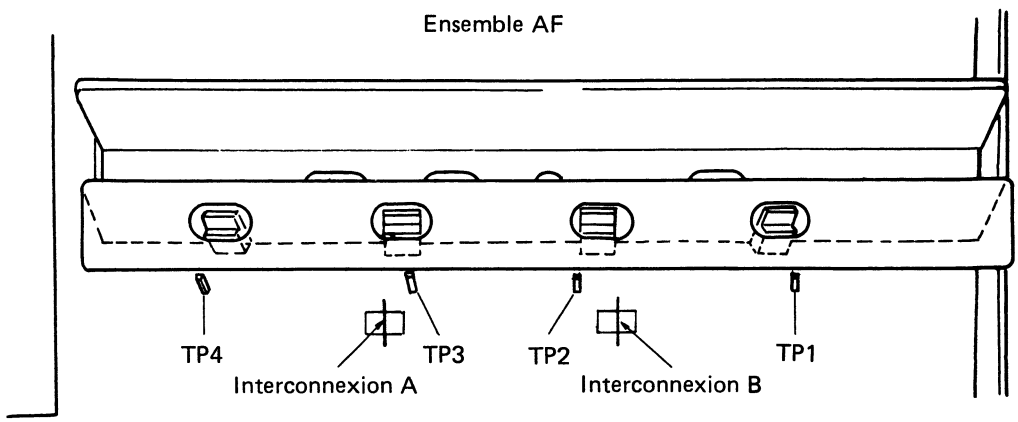


10. RÉGLAGE

Réglage du courant déwatté

1. Tourner la commande de volume sur la position minimum, mettre l'appareil sous tension et attendre environ 10 minutes.
2. Connecter un voltmètre CC aux bornes TP (voie droite: TP1 ⊖ et TP2⊕, voie gauche: TP4 ⊖ et TP3 ⊕) d'ensemble AF.
3. Vérifier que la tension entre TP1 et TP2 (voie droite) soit entre 2 mV et 110 mV CC. Vérifier de la même manière la voie gauche (entre TP3 et TP4). Couper l'interconnexion A (voie gauche) et l'interconnexion B (voie droite) si la tension est inférieure a 2 mV. Lorsque la tension est supérieure a 110 mV, s'assurer de l'absence de panne de circuit.

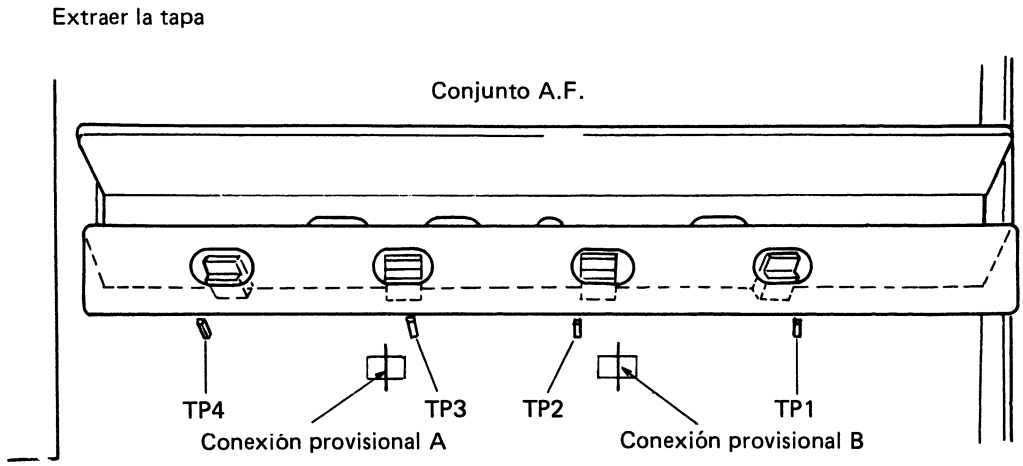
Enlever le couvercle



10. AJUSTE

Ajuste de la corriente devatiada

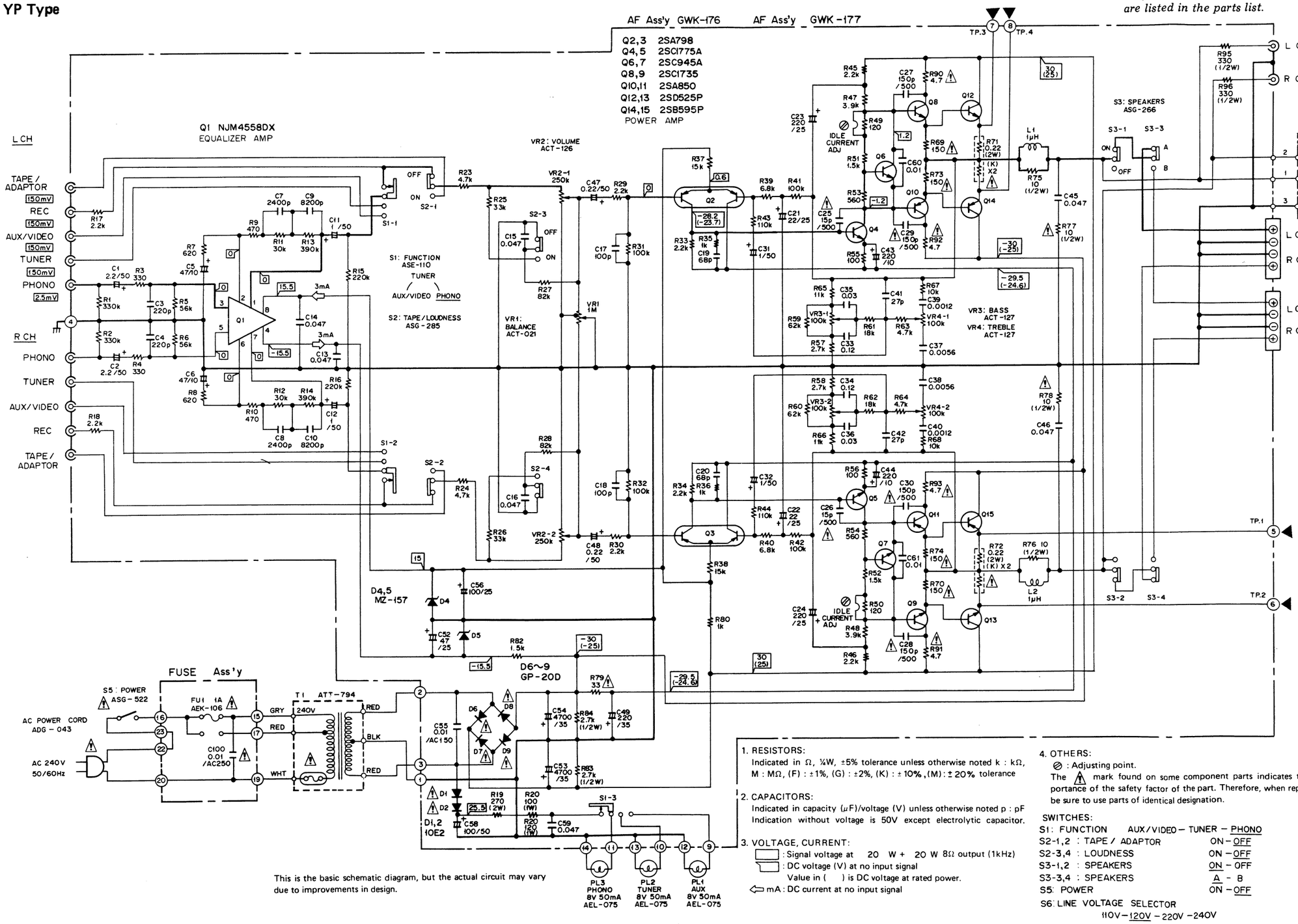
1. Poner el control de volumen (VOLUME) en su posición de nivel mínimo, conectar la alimentación y esperar unos 10 minutos.
2. Conectar un voltímetro de CC a los terminales TP (canal Der.; TP1 ⊖ y TP2 ⊕ , canal Izq.; TP4 ⊖ y TP3 ⊕) del conjunto A.F.
3. Comprobar que la tensión entre TP1 y TP2 (canal Der.) esté dentro del margen de 2 mV - 110 mV CC. Luego realizar una comprobación similar para el canal Izq. (entre TP3 y TP4). Si la tensión es menor de 2 mV, cortar la conexión provisional A (canal Izq.), y conectar provisionalmente B (canal Der.). Si la tensión excede de 110 mV, comprobar que no haya ninguna avería en el circuito.



SCHEMATIC DIAGRAMS

For YP Type

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M) : ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: Signal voltage at 20 W + 20 W 8Ω output (1kHz)
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦ mA : DC current at no input signal

4. OTHERS:
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

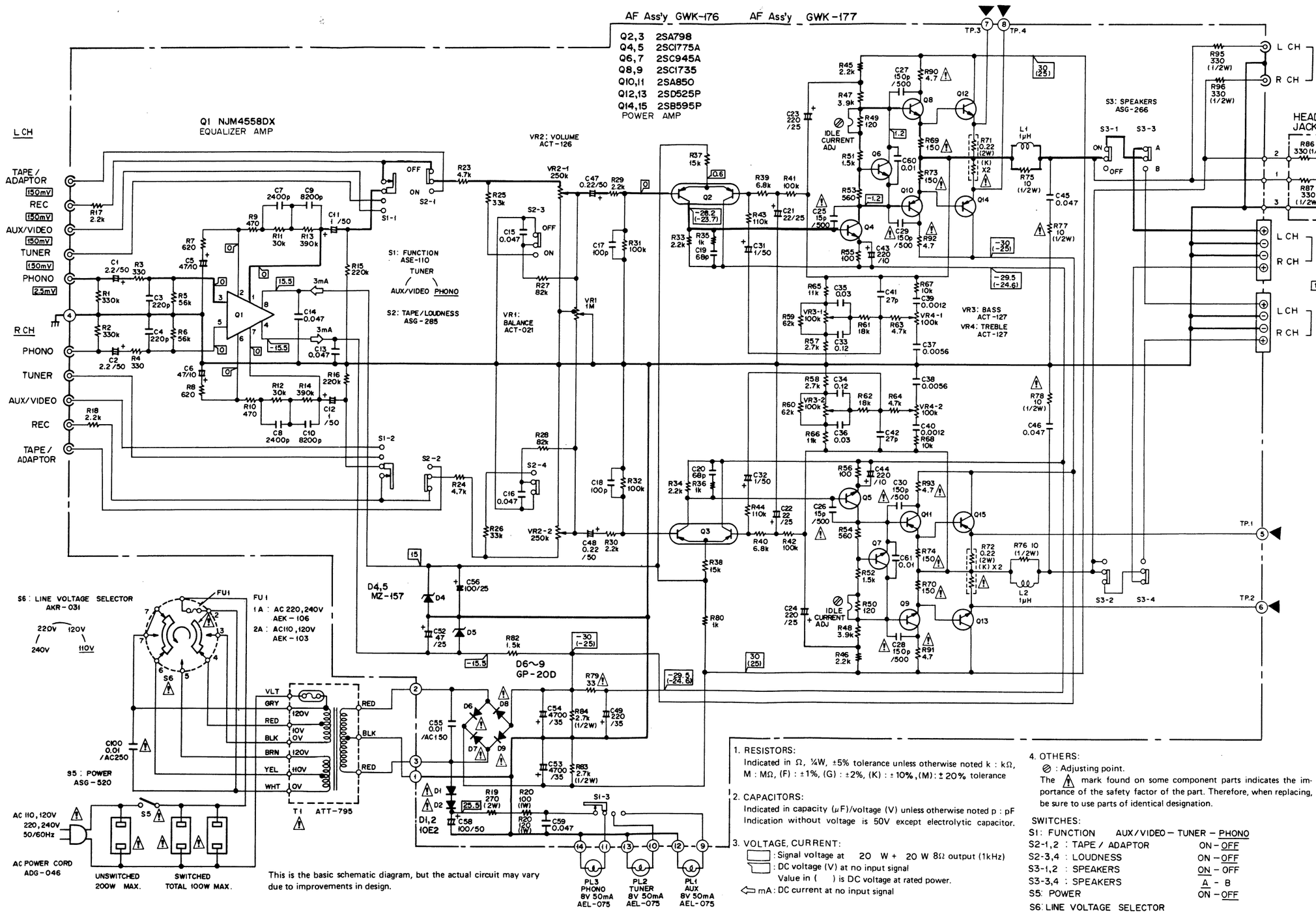
SWITCHES:

S1: FUNCTION	AUX/VIDEO – TUNER –	PHONO
S2-1,2 : TAPE / ADAPTOR	ON –	OFF
S2-3,4 : LOUDNESS	ON –	OFF
S3-1,2 : SPEAKERS	ON –	OFF
S3-3,4 : SPEAKERS	A –	B
S5: POWER	ON –	OFF

S6: LINE VOLTAGE SELECTOR
110V – 120V – 220V – 240V

The underlined indicates the switch position.

For S Type



This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

1. RESISTORS:
   Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M) : ±20% tolerance

2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
   Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
   : Signal voltage at 20 W + 20 W 8Ω output (1kHz)
   : DC voltage (V) at no input signal
   Value in ( ) is DC voltage at rated power.
   ⇦ mA : DC current at no input signal

4. OTHERS:
   ⊘ : Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

SWITCHES:

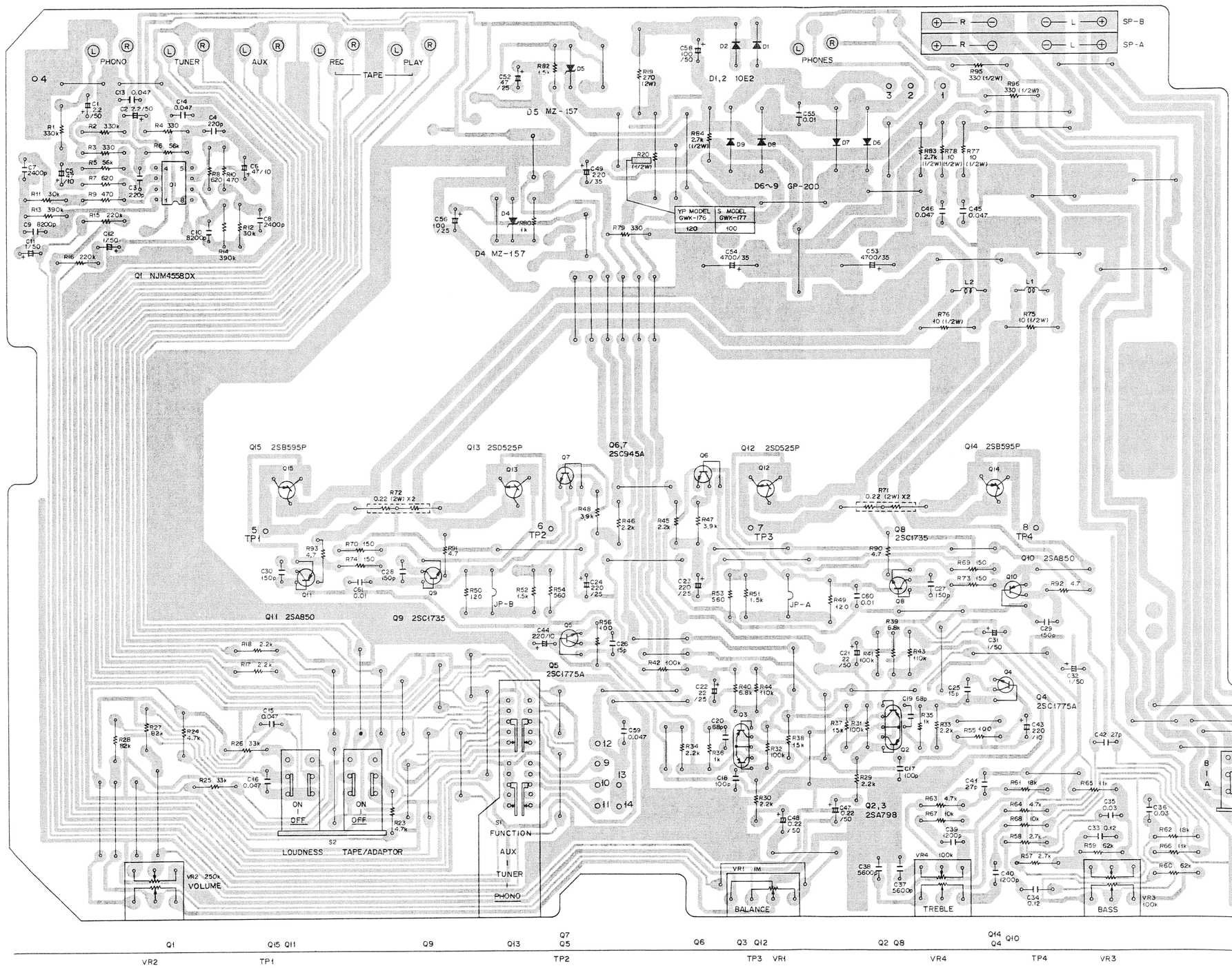
S1: FUNCTION	AUX/VIDEO – TUNER – PHONO
S2-1,2 : TAPE / ADAPTOR	ON – OFF
S2-3,4 : LOUDNESS	ON – OFF
S3-1,2 : SPEAKERS	ON – OFF
S3-3,4 : SPEAKERS	A – B
S5: POWER	ON – OFF

S6: LINE VOLTAGE SELECTOR
110V – 120V – 220V – 240V

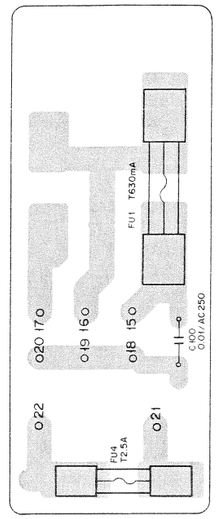
The underlined indicates the switch position.

P.C. BOARD ASSEMBLIES

AF Assembly (GWK-176 for YP type, GWK-177 for S type)



Fuse Assembly (for YP type)



Parts List of AF Assembly (GWK-176 for YP type, GWK-177 for S type)

CAPACITORS

Mark	Part No.	Symbol & Description	
	CEANL 2R2M 50	C1, C2	
⚠	ACH-217	C53, C54	Electrolytic (4700/35V)
	ACG-019	C55	Ceramic (0.01/AC150V)
	CEANL R22M 50	C47, C48	
	CEANL 010M 50	C31, C32	
	CEA 010M 50L	C11, C12	
	CEA 220M 25L	C21, C22	
	CEA 470M 10L	C5, C6	
	CEA 101M 25L	C56	
	CEA 101 M 50L	C58	
	CEA 221M 10L	C43, C44	
	CEA 470M 25L	C52	
	CEA 221M 25L	C23, C24	
	CEA 221M 35L	C49	
	CQMA 122K 50	C39, C40	
	CQMA 562K 50	C37, C38	
	CQMA 124K 50	C33, C34	
	CQMA 242J 50	C7, C8	
	CQMA 822J 50	C9, C10	
	CQMA 303J 50	C35, C36	
⚠	CCDSL 150K 500	C25, C26	
⚠	CCDSL 151K 500	C27–C30	
	CCDSL 270J 50	C41, C42	
	CCDSL 680J 50	C19, C20	
	CCDSL 101J 50	C17, C18	
	CCDSL 221J 50	C3, C4	
	CKDYF 473Z 50	C13–C16, C45, C46, C59	
	CKDYF 103Z 50	C60, C61	

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	ACT-021	VR1	Variable (BALANCE)
★	ACT-126	VR2	Variable (VOLUME)
★	ACT-127	VR3	Variable (BASS)
★	ACT-127	VR4	Variable (TREBLE)
⚠	ACN-070	R71, R72	Wire wound (0.22+0.22/2W)
	RD1/4PM□□□J	R1–R18, R23–R68, R80, R82	
	RS2PL271J	R19	
	RD1/2PS□□□J	R75, R76, R83, R84, R95, R96	
⚠	RD1/4PMFL□□□J	R69, R70, R73, R74, R79, R90–R93	
	RS1PL□□□J	R20	
	RD1/2PSF100J	R77, R78	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	NJM4558DX	Q1
★★	2SA798	Q2, Q3
★★	2SC1775A (2SC1915)	Q4, Q5
★★	2SC945A	Q6, Q7
★★	2SC1735–D* (2SC1735–E*)	Q8, Q9
★★	2SA850-D* (2SA850-E*)	Q10, Q11

*hfe of Q8–Q11 should have the same value.

Mark	Part No.	Symbol & Description
★★	2SD525P-O* (2SD525P-Y*)	Q12, Q13
★★	2SB595P-O* (2SB595P-Y*)	Q14, Q15

*hfe of Q12–Q15 should have the same value.

Mark	Part No.	Symbol & Description
⚠ ★	10E2 (SIB01-02)	D1, D2
★	MZ-157 (WZ-157)	D4, D5
⚠ ★	GP-20D	D6–D9

SWITCHES

Mark	Part No.	Symbol & Description	
★★	ASE-110	S1	Rotary slide switch (FUNCTION)
★★	ASG-285	S2	Push switch (TAPE/ADAPTOR, LOUDNESS)
★★	ASG-266	S3	Push switch (SPEAKERS)

OTHERS

Mark	Part No.	Symbol & Description
	VBZ30P080FMC	Screw 3x8
	AKB-077	Terminal (PHONES)
	AKB-078	Terminal (TAPE/ADAPTOR)
	AKB-079	Terminal (INPUT)
	AKE-047	Terminal (SPEAKERS)
	AEC-078	Insulator wafer
	AKH-005	Insulator spacer
	ABA-257	Screw 2.5x16

Parts List of Fuse Assembly (for YP Type)

Mark	Part No.	Symbol & Description	
⚠	ACG-001	C100	Electrolytic (0.01/AC250V)

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

P.C. BOARD ASSEMBLY

Mark	Symbol & Description	Part No.			Remarks
		KU type	YP type	S type	
	AF assembly	GWK-174	GWK-176	GWK-177	

ELECTRICAL PARTS

Mark	Symbol & Description		Part No.			Remarks
			KU type	YP type	S type	
⚠ ★	T1	Power transformer (120V)	ATT-793	.....	.....	
⚠ ★	T1	Power transformer (240V)	.....	ATT-794	.....	
⚠ ★	T1	Power transformer (110V, 120V, 220V, 240V)	.....	.....	ATT–795	
⚠★★	FU1	Fuse (2.5A)	AEK-102	.....	.....	
⚠★★	FU1	Fuse (1A)	.....	AEK-106	AEK-106	
⚠★★	S1	Push switch (POWER)	ASG-521	ASG-522	ASG-520	
⚠★★	S2	Line voltage selector	.....	.....	AKR-031	
⚠	C1	Ceramic capacitor (0.01/AC 250V)	.....	.....	ACG-001	
⚠		AC socket (AC OUTLETS)	AKP-041	.....	AKP-041	
⚠		AC power cord	ADG-052	ADG-043	ADG-046	
		Screw 3 x 8 (for line voltage selector)	.....	.....	BMZ30P080FZK	

PACKING AND FURNISHED PARTS

Mark	Symbol & Description	Part No.			Remarks
		KU type	YP type	S type	
⚠★★	Fuse (1A)	.....	.....	AEK-106	
⚠★★	Fuse (2A)	.....	.....	AEK-103	
	Operating instructions (English)	ARB-405	ARB-406	ARB-406	
	Packing case	AHD-901	AHD-902	AHD-902	

ADDITIONAL

Service Manual

PIONEER®

STEREO AMPLIFIER

SA-420 YP, S

This additional service manual is applicable to the YP type (Australia model), S type (General export model). The basic performance of the YP and S types is the same as the KU type (U.S.A. model), please refer to the KU type service manual (pp. 1 – 17) with the exception of this supplements.

SPECIFICATIONS

The specifications for YP and S types are the same as the KU type except for following sections:

Miscellaneous

Power Requirements
YP type ..... AC 240V, 50/60HZ
S type ..... AC 110/120/220/240V (Switchable), 50/60Hz
Power Consumption
YP type 150W
S type 60W

ADDITIONAL

Service Manual

PIONEER®

ORDER NO.
ART-647-0

STEREO AMPLIFIER

SA-420 HE, HB
SA-204 HE

- **Both Model SA-420 and SA-204 have the same basic performance, but there are a few minor changes in design.**
- **The basic performance of the HE and HB types is the same as the KU type, please refer to the KU type service manual (ART-646) with the exception of this supplements.**

SPECIFICATIONS

The specifications for HE and HB types are the same as the KU type except for following sections:

Amplifier Section

Hum and Noise (DIN, continuous Power/50mW)
PHONO 67dB/62dB
TUNER, AUX, TAPE PLAY 85dB/62dB

Miscellaneous

Power Requirements . . . . . AC 220V/240V (Switchable) 50/60Hz
Power Consumption 150W

Line Voltage Section

Line voltage can be changed with following steps.

1. Disconnect the AC power cord.
2. Remove the Top cover.
3. Take out the fuse (AEK-406) from the fuse assembly.
4. Re-install the fuse in the correct voltage indication (see Fig. 1).
5. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-193	220V label
AAX-192	240V label

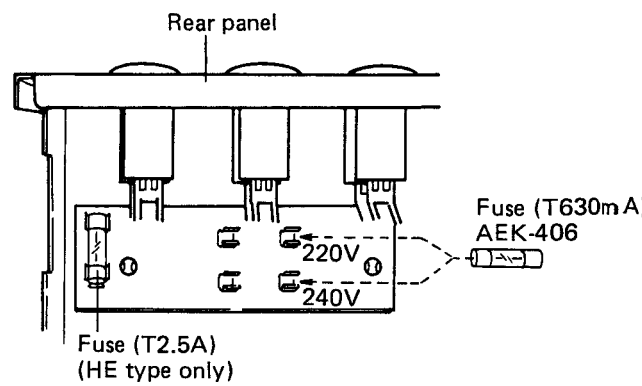


Fig. 1

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
U.S. PIONEER ELECTRONICS CORPORATION 85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.
PIONEER ELECTRONIC (EUROPE) N.V. Luithagen-Haven 9, 2030 Antwerp, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

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CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ *GENERALLY MOVES FASTER THAN* ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

P.C. BOARD ASSEMBLY

Mark	Symbol & Description	Part No.			
		SA-420/KU	SA-420/HB	SA-420/HE	SA-204/HE
	AF assembly	GWK-174	GWK-175	GWK-175	GWK-175

ELECTRICAL PARTS

Mark	Symbol & Description	Part No.			
		SA-420/KU	SA-420/HB	SA-420/HE	SA-204/HE
⚠ ★	T1 Power transformer (120V)	ATT-793	.....	.....	.....
⚠ ★	T1 Power transformer (220V/240V)	.....	ATT-794	ATT-794	ATT-794
⚠ ★★	FU1 Fuse (2.5A)	AEK-102	.....	.....	.....
⚠ ★★	FU1 Fuse (T630mA/250V)	.....	AEK-406	AEK-406	AEK-406
⚠ ★★	FU2, FU3 Fuse (T2A/250V)	.....	AEK-017	AEK-017	AEK-017
⚠ ★★	FU4 Fuse (T2.5A/250V)	.....	.....	AEK-403	AEK-403
⚠ ★★	S1 Push switch (POWER)	ASG-521	ASG-522	ASG-522	ASG-522
⚠	AC socket (AC OUTLETS)	AKP-041	AKP-044	AKP-026	AKP-026
⚠	AC power cord	ADG-052	ADG-051	ADG-041	ADG-041

OTHERS

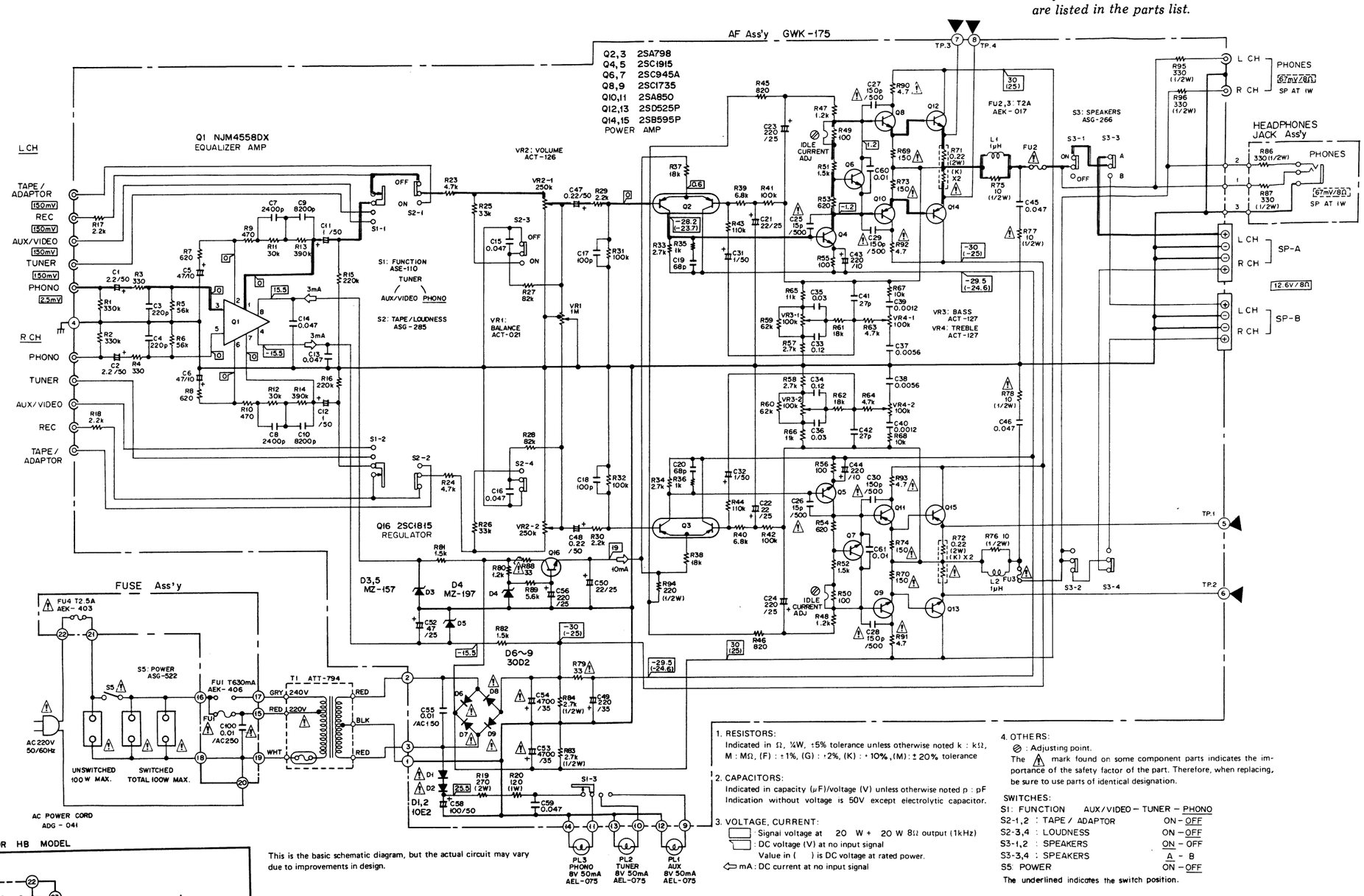
Mark	Symbol & Description	Part No.			
		SA-420/KU	SA-420/HB	SA-420/HE	SA-204/HE
	Front panel assembly	ANM-008	ANM-008	ANM-008	ANM-043
	Knob (VOLUME, FUNCTION)	AAB-251	AAB-251	AAB-251	AAB-276
	Knob (BASS, TREBLE, BALANCE)	AAB-250	AAB-250	AAB-250	AAB-275

PACKING AND FURNISHED PARTS

Mark	Symbol & Description	Part No.			
		SA-420/KU	SA-420/HB	SA-420/HE	SA-204/HE
	Operating instructions (English)	ARB-405	ARB-406	.....	.....
	Operating instructions (English/German/French/Italian)	.....	.....	ARD-160	.....
	Operating instructions (French)	.....	.....	.....	ARD-173
	Packing case	AHD-901	AHD-902	AHD-902	AHD-935

SCHEMATIC DIAGRAM

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M) : ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: Signal voltage at 20 W + 20 W 8Ω output (1kHz)
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦mA : DC current at no input signal

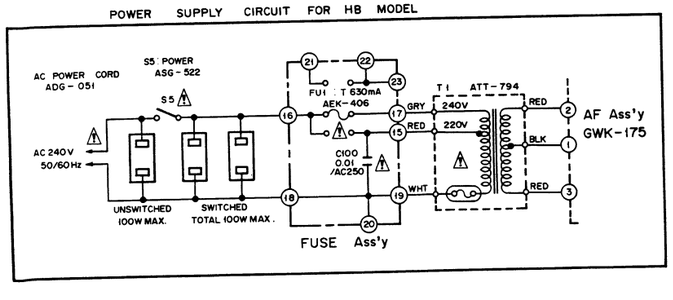
4. OTHERS:
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

SWITCHES:

S1: FUNCTION	AUX/VIDEO – TUNER – PHONO	
S2-1,2	TAPE / ADAPTOR	ON – OFF
S2-3,4	LOUDNESS	ON – OFF
S3-1,2	SPEAKERS	ON – OFF
S3-3,4	SPEAKERS	A – B
S5	POWER	ON – OFF

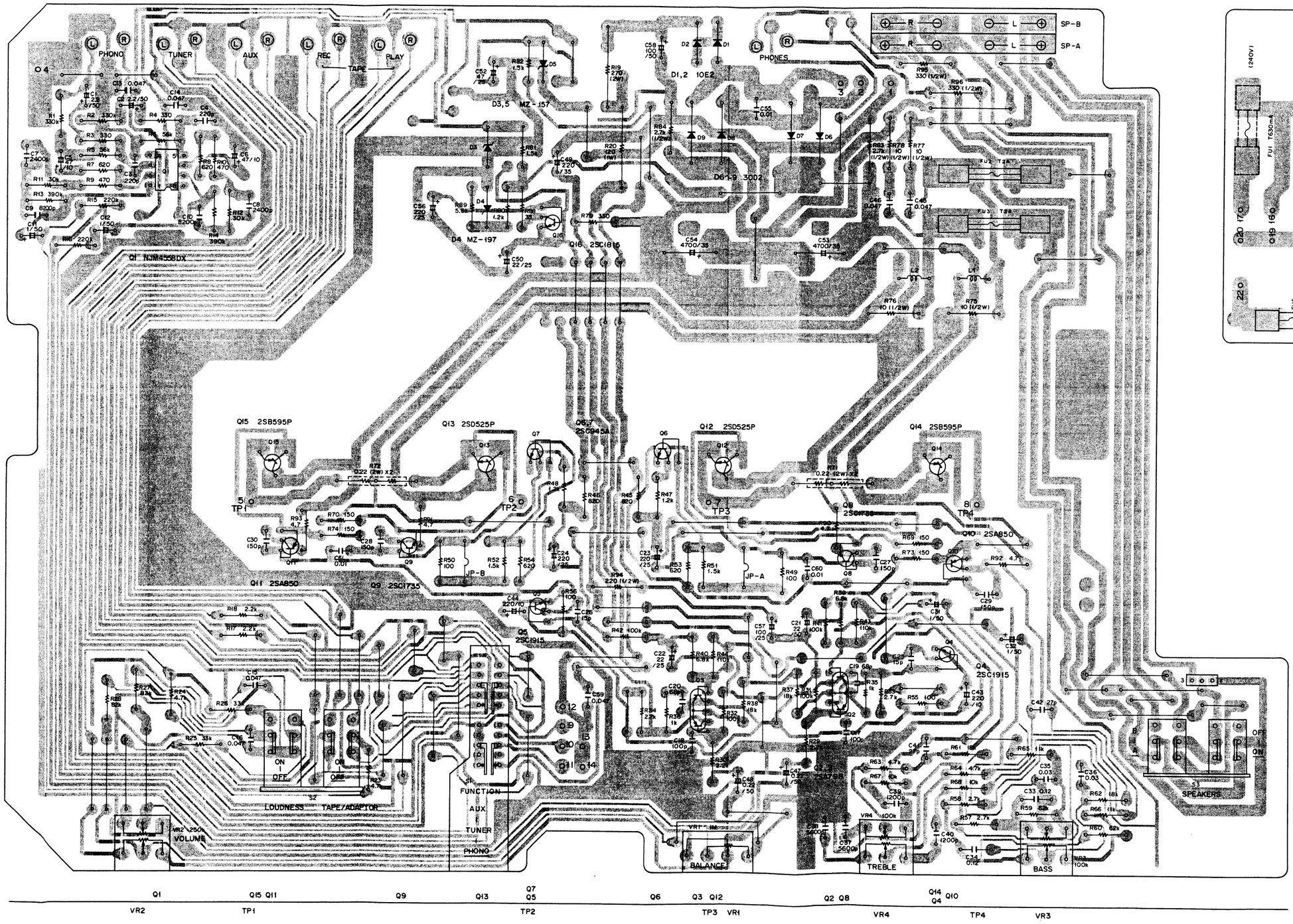
The underlined indicates the switch position.

POWER SUPPLY CIRCUIT FOR HB MODEL

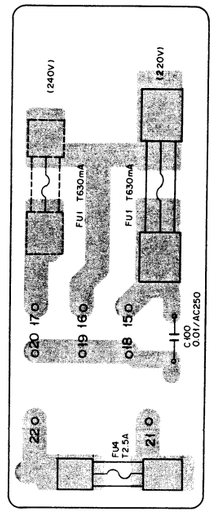


P.C. BOARD ASSEMBLIES

AF Assembly (GWK-175)



Fuse Assembly



Parts List of AF Assembly (GWK-175)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEANL 2R2M 50	C1, C2
⚠	ACH-217	C53, C54 Electrolytic (4700/35V)
	ACG-019	C55 Ceramic (0.01/AC150V)
	CEANL 2R2M 50	C47, C48
	CEANL 010M 50	C31, C32
	CEA 010M 50L	C11, C12
	CEA 220M 25L	C21, C22, C50
	CEA 470M 10L	C5, C6
	CEA 101M 25L	C57
	CEA 101M 50L	C58
	CEA 221M 10L	C43, C44
	CEA 470M 25L	C52
	CEA 221M 25L	C23, C24, C56
	CEA 221M 35L	C49
	CQMA 122K 50	C39, C40
	CQMA 562K 50	C37, C38
	CQMA 124K 50	C33, C34
	CQMA 242J 50	C7, C8
	CQMA 822J 50	C9, C10
	CQMA 303J 50	C35, C36
⚠	CCDSL 150K 500	C25, C26
⚠	CCDSL 151K 500	C27–C30
	CCDSL 270J 50	C41, C42
	CCDSL 680J 50	C19, C20
	CCDSL 101J 50	C17, C18
	CCDSL 221J 50	C3, C4
	CKDYF 473Z 50	C13–C16, C45, C46, C59
	CKDYF 103Z 50	C60, C61

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	ACT-021	VR1 Variable (BALANCE)
★	ACT-126	VR2 Variable (VOLUME)
★	ACT-127	VR3 Variable (BASS)
★	ACT-127	VR4 Variable (TREBLE)
⚠	ACN-070	R71, R72 Wire wound (0.22 + 0.22/2W)
	RD¼PM□□□J	R1–R18, R23–R68, R80–R82, R89
	RS2PL271J	R19
	RD½PS□□□J	R75, R76, R83, R84, R94–R96
⚠	RD¼PMFL□□□J	R69, R70, R73, R74, R79, R88, R90–R93
	RS1PL121J	R20
	RD½PSF100J	R77, R78

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	NJM4558DX	Q1
★★	2SA798	Q2, Q3
★★	2SC1915	Q4, Q5
★★	2SC945A	Q6, Q7
★★	2SC1735-D* (2SC1735-E*)	Q8, Q9
★★	2SA850-D* (2SA850-E*)	Q10, Q11
	*hfe of Q8–Q11 should have the same value.	
★★	2SD525P-O* (2SD525P-Y*)	Q12, Q13
★★	2SB595P-O* (2SB595P-Y*)	Q14, Q15
★★	2SC1815-GR	Q16
	*hfe of Q12–Q15 should have the same value.	
⚠ ★	10E2 (SIB01-02)	D1, D2
★	MZ-157 (WZ-157)	D3, D5
	MZ-197 (WZ-197)	D4
⚠ ★	30D2	D6–D9

SWITCHES

Mark	Part No.	Symbol & Description
★★	ASE-110	S1 Rotary slide switch (FUNCTION)
★★	ASG-285	S2 Push switch (TAPE/ ADAPTOR, LOUDNESS)
★★	ASG-266	S3 Push switch (SPEAKERS)

OTHERS

Mark	Part No.	Symbol & Description
	VBZ30P080FMC	Screw 3x8
	AKB-077	Terminal (PHONES)
	AKB-078	Terminal (TAPE/ADAPTOR)
	AKB-079	Terminal (INPUT)
	AKE-047	Terminal (SPEAKERS)
	AEC-078	Insulator wafer
	AKH-005	Insulator spacer
	ABA-257	Screw 2.5x16

Parts List of Fuse Assembly

Mark	Part No.	Symbol & Description
⚠	ACG-001	C100 Electrolytic (0.01/AC250V)